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Original Research Article

Unmasking Bell's Palsy: A Clinical Investigation Into Facial Nerve Paralysis In COVID-19 Patients

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Abstract:

Background: Bell's Palsy, a sudden-onset facial nerve paralysis, has been increasingly reported in COVID-19 patients, raising concerns about the virus's neurotropic potential. This study investigates the incidence, clinical features, management, and outcomes of Bell's Palsy in COVID-19 patients.

Aim and Objective: Our primary goal is to investigate the incidence, clinical features, management, and outcomes of Bell's Palsy in COVID-19 patients. We are particularly focused on identifying factors associated with recovery outcomes, to provide a clearer understanding of this condition.

Materials and Methods: An observational retrospective study was conducted on 50 COVID-19 patients diagnosed with Bell's Palsy. Data on demographics, COVID-19 severity, Bell's palsy onset, treatment, and recovery outcomes were collected and analyzed.

Results: The incidence of Bell's Palsy among COVID-19 patients was 2.5%. Most patients had mild COVID-19, with a mean onset of Bell's Palsy at 7.4 days post-diagnosis. Right-sided facial paralysis was more common. Corticosteroid therapy was administered to all patients, with 90% achieving complete recovery by six months. Severe COVID-19 and delayed treatment were associated with poorer outcomes.

Conclusions: Bell's Palsy is a potential neurological complication of COVID-19, with early intervention crucial for favourable outcomes. The results of this study highlight the need for further research to fully understand the pathophysiological mechanisms underlying this association and to improve patient care.

Keywords: Bell's Palsy, COVID-19, Facial Nerve Paralysis, Neurological Complications.

Introduction

Bell's Palsy is an acute, idiopathic, unilateral facial nerve paralysis that manifests suddenly and can cause significant morbidity. [1] Although the aetiology of Bell's Palsy remains largely unknown, it is often associated with viral infections, such as herpes simplex virus (HSV). [2] Recently, with the global spread of the novel coronavirus (SARS-CoV-2), responsible for the COVID-19 pandemic, emerging evidence suggests a potential link between COVID-19 and various neurological complications, including Bell's palsy. [3, 4]

SARS-CoV-2 primarily affects the respiratory system, but its impact on the nervous system has been increasingly recognized. [5] Neurological manifestations in COVID-19 patients, such as anosmia, ageusia, encephalitis, and stroke, have been widely reported. [6] Bell's Palsy, although less common, has been observed in COVID-19 patients, raising concerns about the virus's neurotropic potential. The pathophysiology underlying this association may involve direct viral invasion, immune-mediated damage, or vascular complications. [7]

However, the incidence of Bell's Palsy in COVID-19 patients and its clinical features and outcomes still need to be explored. This study aims to fill this gap by investigating the occurrence and characteristics of Bell's Palsy in COVID-19 patients treated in our hospital's ENT department. By examining patient demographics, comorbidities, treatment approaches, and recovery patterns, this research seeks to better understand the relationship between COVID-19 and Bell's Palsy.

Given the ongoing pandemic and the broad range of COVID-19 manifestations, recognizing and understanding rare neurological complications such as Bell's Palsy is crucial for timely diagnosis and management. This study, by providing insights into the incidence, clinical features, management, and outcomes of Bell's Palsy in COVID-19 patients, contributes significantly to the growing knowledge of COVID-19-related neurological conditions. The

findings of this study could potentially improve patient care and outcomes, particularly for those with neurological complications.

Materials and Methods

This observational study was conducted in the Department of ENT of a tertiary health care centre between December 2020 to June 2022. It was designed to investigate the incidence, clinical features, management, and outcomes of Bell's Palsy in patients diagnosed with COVID-19. The study involved a retrospective analysis of medical records and a prospective component that included direct patient assessments.

Study Population: The study included patients diagnosed with Bell's Palsy who were also confirmed to have COVID-19 through RT-PCR testing. The inclusion criteria were:

1. Adult patients (≥18 years) with a clinical diagnosis of Bell's Palsy.
2. Confirmed diagnosis of COVID-19 by RT-PCR within the same time frame.
3. Patients who provided informed consent for participation in the study.

Exclusion criteria

1. Patients with facial Palsy due to other causes (e.g., trauma, stroke, neoplasm).
2. Patients with incomplete medical records or lost to follow-up.

Data Collection

Data were collected retrospectively from patient medical records and prospectively through direct patient assessments. The following data were recorded:

- **Demographic information**: age, sex, and comorbidities.
- **COVID-19 details**: date of diagnosis, severity of COVID-19 (categorized as mild, moderate, or severe based on clinical guidelines), and treatment received for COVID-19.
- **Bell's Palsy details** the date of onset of facial paralysis, the side of the face involved, associated symptoms (e.g., ear pain, altered taste), and House-Brackmann grading at presentation.
- **Management**: treatment modalities used for Bell's Palsy (e.g., corticosteroids, antiviral therapy, physical therapy) and duration of treatment.
- **Outcomes**: House-Brackmann grading at follow-up visits (1 month, three months, and six months), recovery status (complete, partial, or no recovery), and any recurrence of symptoms.

Statistical Analysis: Data were analyzed using statistical software [SPSS version 25]. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as means ± standard deviations or medians with interquartile ranges, depending on the data distribution.

The incidence of Bell's Palsy among COVID-19 patients was calculated by dividing the number of Bell's palsy cases by the total number of COVID-19 patients seen in the ENT department during the study period. Comparisons between groups (e.g., complete recovery vs. partial/no recovery) were made using chi-square tests for categorical variables and t-tests or Mann-Whitney U tests for continuous variables.

A logistic regression analysis was performed to identify factors associated with poor recovery outcomes. Variables with a p-value of less than 0.05 in univariate analysis were included in the multivariate model, and a p-value of less than 0.05 was considered statistically significant for all analyses.

Results

Patient Demographics and Clinical Characteristics: This study included 50 patients with Bell's Palsy and confirmed COVID-19 infection. The mean age of the patients was 45.2 ± 12.8 years, ranging from 23 to 71 years. There were 28 male patients (56%) and 22 female patients (44%). The majority of the patients had mild COVID-19 (30 patients, 60%), followed by moderate (15 patients, 30%) and severe (5 patients, 10%) cases.

Table 1: Patient Demographics and Clinical Characteristics

Characteristic	Value
Number of patients	50
Mean age (years)	45.2 ± 12.8
Gender distribution	Male: 28 (56%), Female: 22 (44%)
COVID-19 severity	Mild: 30 (60%), Moderate: 15 (30%), Severe: 5 (10%)
Side of facial paralysis	Right: 28 (56%), Left: 22 (44%)
Associated symptoms	Ear pain: 12 (24%), Altered taste: 8 (16%)
Mean onset of Bell's Palsy	7.4 ± 3.2 days post COVID-19 diagnosis

Incidence of Bell's Palsy in COVID-19 Patients: The incidence of Bell's Palsy among COVID-19 patients seen in the ENT department was 2.5% (50 out of 2000 patients).

Clinical Features of Bell's Palsy: The onset of Bell's Palsy occurred on average 7.4 ± 3.2 days after the diagnosis of COVID-19. Right-sided facial paralysis was observed in 28 patients (56%), while 22 patients (44%) had left-sided paralysis. Associated symptoms included ear pain in 12 patients (24%) and altered taste in 8 (16%).

The severity of Bell's Palsy at presentation, as measured by the House-Brackmann grading system, was as follows:

- Grade II: 10 patients (20%)
- Grade III: 25 patients (50%)
- Grade IV: 15 patients (30%)

Table 2: House-Brackmann Grading at Presentation

Grade	Number of Patients (%)
Grade II	10 (20%)
Grade III	25 (50%)
Grade IV	15 (30%)

Treatment and Management: All patients received oral corticosteroids (prednisolone 1 mg/kg) for 10 days as part of their treatment for Bell's Palsy. Antiviral therapy (acyclovir) was administered to 30 patients (60%) based on the clinician's discretion. Additionally, 20 patients (40%) underwent physical therapy, including facial exercises.

Outcomes: At the 1-month follow-up, 30 patients (60%) showed complete recovery (House-Brackmann Grade I), 15 patients (30%) had partial recovery (House-Brackmann Grade II-III), and 5 patients (10%) had no recovery (House-Brackmann Grade IV-V). At 3 months, the complete recovery rate increased to 80%, with 10 patients (20%) showing partial recovery and no patients remaining in the no-recovery category. At 6 months, 90% of patients had achieved complete recovery, and 10% had partial recovery.

Table 3: Recovery Outcomes at Follow-Up

Follow-Up Duration	Complete Recovery (Grade I)	Partial Recovery (Grade II-III)	No Recovery (Grade IV-V)
1 month	30 (60%)	15 (30%)	5 (10%)
3 months	40 (80%)	10 (20%)	0 (0%)
6 months	45 (90%)	5 (10%)	0 (0%)

Factors Associated with Poor Recovery: Multivariate logistic regression analysis identified severe COVID-19 ($p = 0.03$) and delayed initiation of corticosteroid therapy ($p = 0.02$) as significant predictors of poor recovery outcomes.

Table 4: Multivariate Logistic Regression Analysis for Predictors of Poor Recovery

Predictor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Severe COVID-19	3.5	1.2 – 10.4	0.03
Delayed corticosteroid therapy	4.2	1.5 – 11.7	0.02

Discussion

This study explored the incidence and clinical characteristics of Bell's Palsy in patients with COVID-19, finding an incidence rate of 2.5%, which is significantly higher than the baseline incidence of Bell's Palsy in the general population, typically ranging from 15 to 30 per 100,000 people annually. [8]

The findings align with several studies that have reported an increased risk of Bell's Palsy associated with COVID-19. For instance, a large study using data from over 348,000 COVID-19 patients reported an incidence of Bell's Palsy at 0.08%, translating to approximately 82 per 100,000 patients. [8] This suggests that SARS-CoV-2 might have a neurotropic effect or could induce an immune-mediated response that increases the risk of peripheral nerve palsies like Bell's Palsy. [9]

Additionally, the recovery outcomes in this study, where 90% of patients achieved complete recovery by 6 months, are consistent with general expectations for Bell's palsy prognosis. However, it is noteworthy that patients with severe COVID-19 had poorer recovery outcomes, which suggests a possible correlation between the severity of the viral infection and the extent of nerve damage or immune response.

Moreover, the study's findings regarding the delayed initiation of corticosteroid therapy being associated with poorer outcomes align with previous research, emphasizing the importance of early treatment to optimize recovery. [10, 11]

This study also highlights a need for heightened awareness among clinicians regarding the neurological complications of COVID-19, including Bell's Palsy, to ensure timely diagnosis and management. The potential mechanisms, including viral neuroinvasion and immune-mediated damage, warrant further investigation to understand better the pathophysiology underlying this association. [8-11]

Clinical Implications

This study underscores the importance of recognizing Bell's Palsy as a potential neurological complication in COVID-19 patients. Early diagnosis and prompt initiation of corticosteroid therapy are crucial for improving recovery outcomes, especially in patients with severe COVID-19. The findings suggest that clinicians should maintain a high index of suspicion for Bell's Palsy in patients presenting with facial paralysis during or after a COVID-19 diagnosis. This awareness can lead to timely interventions, reducing long-term morbidity associated with this condition. Moreover, the study highlights the need for further research into the pathophysiological mechanisms linking COVID-19 and Bell's Palsy to optimize treatment protocols.

This study has several limitations, including its retrospective design and reliance on medical records, which may result in incomplete data. Additionally, the study was conducted at a single centre with a relatively small sample size, potentially limiting the generalizability of the findings. Further multicenter studies with larger cohorts are recommended to validate these results and provide a more comprehensive understanding of the association between COVID-19 and Bell's Palsy.

Conclusion

This study highlights a notable incidence of Bell's Palsy among COVID-19 patients, emphasizing the virus's potential to trigger neurological complications. The findings suggest that the severity of COVID-19 and delayed corticosteroid therapy are significant predictors of poorer recovery outcomes in Bell's Palsy. Early recognition and prompt treatment are crucial for improving patient outcomes. These results contribute to the growing body of evidence linking COVID-19 with neurological manifestations, underscoring the need for continued vigilance and research to optimize patient care and management strategies.

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